

# MARK TRINDER

## Canada

Centre for Heart and Lung Innovation  
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## United States – as of March 28/2020

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mtrinder@alumni.ubc.ca

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## EDUCATION

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- 2016-Present    **M.D./Ph.D. Candidate**  
University of British Columbia, Department of Experimental Medicine  
Dissertation: TBD  
Supervisor: Dr. Liam Brunham  
Funded by: Vanier Canada Graduate Scholarship
- 2014            **M.Sc.**  
The University of Western Ontario, Microbiology and Immunology  
Thesis: "Mitigation of pesticide toxicity by food-grade lactobacilli."  
Supervisor: Dr. Gregor Reid  
Funded by: Alexander Graham Bell Canada Graduate Scholarship
- 2014            **B.Sc. with distinction**  
The University of Western Ontario, Department of Physiology and Pharmacology  
Western Gold Medal

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## RESEARCH INTERESTS

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My work and research interests combine genetic epidemiology and functional validation studies to better understand:

1. why people suffer from premature heart attacks, strokes, and other cardiovascular events while other people appear to be protected throughout life?;
2. why do people with severe infections differ in clinical outcomes and response to therapeutic treatments?; and
3. how do metabolic traits modulate the human immune and coagulation response, and vice-versa?

The overall goal of this work is to improve the practice of preventative medicine for metabolic and infectious illnesses which are associated with a large proportion of human morbidity and mortality.

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## RESEARCH EXPERIENCE

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- 2016-Present    **University of British Columbia, Vancouver, Canada**  
**Graduate Researcher**  
Project: "Identification of genetic and environmental modifiers of familial hypercholesterolemia"
  - Implemented a targeted genetic sequencing platform and workflow to generate clinical genetic reports for patients with lipid disorders in the Healthy Heart Program at St. Paul's Hospital, Vancouver. To date, I have generated >800 clinical reports.
  - Demonstrated that polygenic factors are additional modifiers of cardiovascular risk in individuals with a monogenic disease (*i.e.* familial hypercholesterolemia).
  - Identified multiple new genetic variants that are causative of familial hypercholesterolemia and added these to the ClinVar database.  
Project: "Plasma lipoproteins as causal risk factors for infectious disease and drug targets for sepsis therapy".

- Demonstrated that the inverse association between levels of high-density lipoprotein cholesterol and risk of sepsis is likely causal.
- Identified that cholesteryl ester transfer protein is an important regulator of high-density lipoprotein cholesterol levels during sepsis.
- Demonstrated that inhibiting cholesteryl ester transfer protein improves sepsis outcomes in mouse models.

2014-2016

**The University of Western Ontario, London, Canada  
Graduate Researcher**

Project: "Preventing off-target insect toxicity of pesticides with beneficial microbes"

- Established *Drosophila melanogaster* as a tool for modeling host-microbe-environment interactions.
- Generated and published foundational data to support current studies designed to investigate whether beneficial microbes could promote honeybee health and reduce the risk of colony collapse disorder (<https://seed.com/seedlabs/>).

2013-2014

**The University of Western Ontario, London, Canada  
Undergraduate Research Assistant**

Project: "Determination of the mechanisms by which the insulin receptor on pancreatic  $\beta$ -cells regulate(s) cell growth, function, and survival."

## PUBLICATIONS

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# Denotes equal contribution.

### Peer-Reviewed Journal Publications: Published or Accepted

1. **Trinder M**, Francis GA, Brunham LR. Association of monogenic vs polygenic hypercholesterolemia with risk of atherosclerotic cardiovascular disease. *JAMA Cardiology*. doi: 10.1001/jamacardio.2019.5954.
2. **Trinder M**, Walley KR, Boyd JH, Brunham LR. Causal inference for genetically determined levels of high-density lipoprotein cholesterol and risk of infectious disease. *Arteriosclerosis, Thrombosis, and Vascular Biology*. 2020 Jan;40(1):267-278. doi: 10.1161/ATVBAHA.119.313381.
3. Al Kramer, **Trinder M**, Brunham LR. Estimating the prevalence of familial hypercholesterolemia in acute coronary syndrome: a systematic review and meta-analysis. *Canadian Journal of Cardiology*. 2019 Oct;35(10):1322-1331. doi: 10.1016/j.cjca.2019.06.017.
4. **Trinder M**, Li X, DeCastro ML, Cermakova L, Sadananda S, Jackson LM, Azizi H, Mancini GBJ, Francis GA, Frohlich J, Brunham LR. Risk of premature atherosclerotic disease in patients with monogenic versus polygenic familial hypercholesterolemia. *Journal of the American College of Cardiology*. 2019 Jul; 74(4):512-522. doi: 10.1016/j.jacc.2019.05.043.
5. **Trinder M**, Boyd JH, Brunham LR. Molecular regulation of plasma lipid levels during systemic inflammation and sepsis. *Current Opinions in Lipidology*. 2019 Apr;30(2):108-116. doi: 10.1097/MOL.0000000000000577.
6. **Trinder M**, Genga KR, Kong HJ, Blauw LL, Lo C, Li X, Cirstea M, Wang Y, Rensen PCN, Russell JA, Walley KR, Boyd JH, Brunham LR. Cholesteryl ester transfer protein influences high-density lipoprotein levels and survival in sepsis. *American Journal of Respiratory and Critical Care Medicine*. 2019 Apr 1;199(7):854-862. doi: 10.1164/rccm.201806-1157OC.
7. Daisley BA, Monachese M, **Trinder M**, Bisanz JE, Chmiel JA, Burton JP, Reid G. Immobilization of cadmium and lead by *Lactobacillus rhamnosus* GR-1 mitigates apical-to-basolateral heavy metal translocation in a Caco-2 model of the intestinal epithelium. *Gut Microbes*. 2018 Nov 14:1-13. doi: 10.1080/19490976.2018.1526581.
8. Genga KR, **Trinder M**, Kong HJ, Li X, Leung AKK, Shimada T, Walley KR, Russell JA, Francis GA, Brunham LR, Boyd JH. CETP genetic variant rs1800777 (allele A) is associated with abnormally low HDL-C levels and increased risk of AKI during sepsis. *Scientific Reports*. 2018 Nov 13;8(1):16764. doi: 10.1038/s41598-018-35261-2.
9. Daisely BA#, **Trinder M**#, McDowell TW, Collins SL, Sumarah MW, Reid G. Microbiota-mediated modulation of organophosphate insecticide toxicity by species-dependent lactobacilli interactions in a *Drosophila*

melanogaster insect model. *Applied and Environmental Microbiology*. 2018 Apr 16;84(9). pii: e02820-17. doi: 10.1128/AEM.02820-17.

10. Daisley BA<sup>#</sup>, **Trinder M<sup>#</sup>**, McDowell TW, Welle H, Dube JS, Ali SN, Leong HS, Sumarah MW, Reid G. Neonicotinoid-induced pathogen susceptibility is mitigated by *Lactobacillus plantarum* immune stimulation in a *Drosophila melanogaster* model. *Scientific Reports*. 2017 Jun 2;7(1):2703. doi: 10.1038/s41598-017-02806-w.
11. **Trinder M<sup>#</sup>**, Daisley BA<sup>#</sup>, Dube JS, Reid G. *Drosophila melanogaster* as a high-throughput model for host-microbiota interactions. *Frontiers in Microbiology*. 2017 Apr 28;8:751. doi: 10.3389/fmicb.2017.00751.
12. **Trinder M**, McDowell TW, Daisley BA, Ali SN, Leong H, Sumarah MW, Reid G. Probiotic *Lactobacillus rhamnosus* reduces organophosphate pesticide absorption and toxicity to *Drosophila melanogaster*. *Applied and Environmental Microbiology*. 2016 Sep 30;82(20):6204-6213.
13. **Trinder M<sup>#</sup>**, Zhou L<sup>#</sup>, Riopel M, Wang R.  $\beta$ -cell insulin receptor deficiency during in utero development induces an islet compensatory response. *Oncotarget*. 2016 Jul 19;7(29):44927-44940. doi: 10.18632/oncotarget.10342.
14. **Trinder M**, Bisanz JE, Burton JP, Reid G. Probiotic lactobacilli: a potential prophylactic treatment for pesticide bioaccumulation and associated toxicity. *Beneficial Microbes*. 2015;6(6):841-7. doi: 10.3920/BM2015.0022.
15. Riopel M, Li J, **Trinder M**, Fellows GF, Wang R. Fibrin enhances human fetal islet-epithelial cell differentiation via p70s6k and promotes vascular formation during transplantation. *Laboratory Investigation*. 2015 Aug; 95(8):925-936. doi: 10.1038/labinvest.2015.74. Epub 2015 Jun 1.
16. **Trinder M**, Bisanz JE, Burton JP, Reid G. Bacteria need “sleep” too?: microbiome circadian rhythmicity, metabolic disease, and beyond. *University of Toronto Medical Journal*. 2015 May;92(3):52-55.
17. Riopel M, **Trinder M**, Wang R. Fibrin, a scaffold material for islet transplantation and pancreatic endocrine tissue engineering. *Tissue Engineering Part B Reviews*. 2015 Feb;21(1):34-44. doi: 10.1089/ten.TEB.2014.0188.

#### Peer-Reviewed Journal Publications: Submitted or Under Revision

1. **Trinder M**, Paquette M, Cermakova L, Ban M, Hegele RA, Baass A, Brunham LR. Polygenic contribution to low-density lipoprotein cholesterol levels and cardiovascular risk in monogenic familial hypercholesterolemia. *Circulation: Genomic and Precision Medicine*. Submitted: 2020-01-15 (manuscript ID: CIRCCVG/2020/002919).
2. **Trinder M**, DeCastro ML, Azizi H, Cermakova L, Jackson LM, Mancini GBJ, Francis GA, Frohlich J, Brunham LR. Elevated lipoprotein(a) in clinical familial hypercholesterolemia reflects ascertainment bias. *Journal of the American College of Cardiology*. Submitted: 2020-01-02 (manuscript ID: JACC122419-4875).
3. Saw J, Min-Lee Y, **Trinder M**, Starovoytov A, Mathis MR, Hunker, Birt I, Schmidt E, Jackson L, Fendrikova-Mahlay N, Zawistowski M, Brummett CM, Zoellner S, Katz A, Coleman D, Swan K, Gornik HL, Stanley JC, Brunham LR, Ganesh SK. A novel risk locus on chromosome 1q21.2 and additional genetic loci influence the risk of spontaneous coronary artery dissection and myocardial infarction. *Nature Communications*. Submitted: 2019-12-31 (manuscript ID: NCOMMS-19-42204-T).

#### Preprint Publications

1. **Trinder M**, Brunham LR. Polygenic modulation of lipoprotein(a)-associated cardiovascular risk. *MedRxiv*. doi: <https://doi.org/10.1101/2020.02.22.20026757>.
2. Russell JA, **Trinder M**, Lee T, Brunham LR, Hsu K, Boyd JH, Singer J, Walley KR. Diabetes increases risk of sepsis, but not mortality, inflammatory or lipid responses (May 13, 2019). Available at SSRN: <https://ssrn.com/abstract=3387518>.

#### Peer-Reviewed Published Abstracts

1. Brunham LR, **Trinder M**, Boyd JH. Genetic regulation of HDL cholesterol levels during sepsis. *Atherosclerosis*. 2018 Aug; 275:e10. doi: 10.1016/j.atherosclerosis.2018.06.913
2. **Trinder M**, Genga KR, Kong J, Cody Lo, Mihai Cirstea, James A Russell, Keith R Walley, Boyd JH, Brunham LR. Genetic variation in the cholesteryl ester transfer protein (CETP) gene influences HDL cholesterol levels

and clinical outcomes in sepsis *Atherosclerosis Supplements*. 2018 Jun;32:33. doi: 10.1016/j.atherosclerosis.2018.04.093.

3. Zhou L<sup>#</sup>, **Trinder M<sup>#</sup>**, Riopel M, Li J, Wang R. Temporally controlled knockout of the  $\beta$ -cell insulin receptor during in utero development induces an islet compensatory response. *Canadian Journal of Diabetes*. 2014 Oct; 38(5):S18.

## GRANTS AND FELLOWSHIPS

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### Grants

- 2020 **CETP inhibition as a novel treatment to remove pathogen lipids and improve survival in sepsis**, Canadian Institutes of Health Research Project Grant (612,000 CAD / 5 years).  
Co-Applicant
- 2019 **Faculty of Medicine Graduate Student Initiative Fund – Research Partnership Initiatives Scholarship**, University of British Columbia, Faculty of Medicine (3,000 CAD).  
Principal Applicant

### Fellowships

- 2020 **Canada Graduate Scholarships - Michael Smith Foreign Study Supplements**, Canadian Institutes of Health Research (6,000 CAD / 1 year).
- 2018 **Vanier Canada Graduate Scholarship**, Canadian Institutes of Health Research (150,000 CAD / 3 year).
- 2016 **Four Year Doctoral Fellowship**, University of British Columbia (15,462 CAD / 1 year, in name 3 years)
- 2015 **Ontario Graduate Scholarship – declined** (15,000 CAD).
- 2015 **Alexander Graham Bell Canada Graduate Scholarship**, Natural Sciences and Engineering Research Council of Canada (17,500 CAD).

## AWARDS AND HONORS

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- 2020 **Centre for Heart Lung Innovation Trainee Travel Award**, University of British Columbia, Centre for Heart and Lung Innovation (800 CAD).
- 2020 **Harry and Florence Dennison Fellowship in Medical Research**, University of British Columbia, Faculty of Medicine (10,800 CAD).
- 2019 **The Cornelis van Breemen Outstanding Young Investigator Award**, University of British Columbia, Centre for Heart and Lung Innovation.
- 2019 **Faculty of Medicine Graduate Award**, University of British Columbia, Faculty of Medicine (500 CAD).
- 2019 **Centre for Heart and Lung Innovation Trainee Research Day: Best Poster Award**, University of British Columbia.
- 2019 **European Atherosclerosis Society Young Investigator Fellowship**, European Atherosclerosis Society (400 EUR).
- 2019 **Centre for Heart Lung Innovation Trainee Travel Award**, University of British Columbia, Centre for Heart and Lung Innovation (800 CAD).
- 2019 **1st Place Golden Helix Abstract Competition**, Golden Helix, Inc. (4,000 CAD).
- 2019 **Travel Award - Institute Community Support – declined**, Canadian Institutes of Health Research (1,000 CAD).
- 2018 **Dorothy Helmer Scholarship in Medicine**, University of British Columbia, Faculty of Medicine (5,800 CAD).

- 2018 **Travel Award - Institute Community Support**, Canadian Institutes of Health Research (1,000 CAD).
- 2018 **CSATVB Trainee Travel Subsidy Award** – declined, Canadian Society of Atherosclerosis, Thrombosis, and Vascular Biology (500 CAD).
- 2018 **Gwynne-Vaughan Memorial Award in Medicine**, University of British Columbia, Faculty of Medicine (1,859 CAD).
- 2017 **The Rookie of the Year Award**, University of British Columbia, Centre for Heart and Lung Innovation
- 2017 **Best Poster Award**, The Canadian Society of Clinical Investigation Young Investigation Forum (250 CAD).
- 2017 **Faculty of Medicine Catalyst Award**, University of British Columbia, Faculty of Medicine (1,000 CAD).
- 2016 **Faculty of Medicine Graduate Award**, University of British Columbia, Faculty of Medicine (8,929 CAD).
- 2016 **Dr. Frederick W. Luney Graduate Travel Award**, University of Western Ontario, Department of Microbiology and Immunology (1,000 CAD).
- 2014 **Frederick W. Luney Entrance Scholarship**, University of Western Ontario, Department of Microbiology and Immunology (3,000 CAD).
- 2015 **Scholarship of Excellence** – declined, University of Toronto, Department of Laboratory Medicine (10,000 CAD).
- 2014 **Entrance Scholarship** – declined, University of Toronto, Department of Laboratory Medicine (5,000 CAD).
- 2014 **Gordon J. Spylo Award in Physiology**, University of Western Ontario, Department of Physiology and Pharmacology (600 CAD).
- 2012 **Frederick N. Lewis Memorial Prize**, University of Western Ontario, Department of Pathology (250 CAD).

## SELECT PRESENTATIONS

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### Oral Presentations

1. **International e-Poster Presentation.** 2019. “Monogenic familial hypercholesterolemia, polygenic familial hypercholesterolemia, and the risk of premature atherosclerotic cardiovascular disease,” 87<sup>th</sup> European Atherosclerosis Society Congress (Maastricht, Netherlands).
2. **International Oral Presentation.** 2018. “Genetic variation in the cholesteryl ester transfer protein (CETP) gene influences HDL cholesterol levels and clinical outcomes in sepsis,” XVIIIth International Symposium on Atherosclerosis (Toronto, Canada).
3. **Oral Presentation.** 2017. “Decreased high-density lipoprotein cholesterol is as an early prognostic marker for poor sepsis outcomes,” Canadian Lipoprotein Conference (Ottawa, Canada).
4. **Institutional Oral Presentation.** 2017. “Lipoprotein genetics and sepsis,” Centre for Heart Lung Innovation Trainee Day (Vancouver, Canada).
5. **International Oral Presentation.** 2017. “*Drosophila melanogaster* as an underutilized model organism for preliminary host-microbe investigations,” International Scientific Association for Probiotics and Prebiotics (Chicago, United States).
6. **Institutional Oral Presentation.** 2013. “ $\beta$ -cell specific fetal insulin receptor knockdown induces an islet compensatory response,” 4th Annual Diabetes Research Day (London, Ontario, Canada).

### Poster Presentations

1. **National Poster Presentation.** 2018. "Mutation status is an independent risk factor for cardiovascular disease in familial hypercholesterolemia," The Canadian Society for Clinical Investigation Young Investigator Forum (Toronto, Canada).
2. **National Poster Presentation.** 2018. "Cholesteryl ester transfer protein genotype influences high-density lipoprotein levels and survival during sepsis," Canadian Student Health Research Forum (Winnipeg, Canada).
3. **National Poster Presentation.** 2017. "Cholesteryl ester transfer protein (CETP) genetics influence plasma lipoprotein metabolism and outcomes in clinical sepsis," The Canadian Society for Clinical Investigation Young Investigator Forum (Toronto, Canada).
4. **International Poster Presentation.** 2017. "Neonicotinoid-induced pathogen susceptibility is mitigated by *Lactobacillus plantarum* immune stimulation in *Drosophila melanogaster*," International Scientific Association for Probiotics and Prebiotics (Chicago, United States).
5. **International Poster Presentation.** 2016. "*Lactobacillus rhamnosus* GR-1-mediated reduction of organophosphate pesticide exposure," International Scientific Association for Probiotics and Prebiotics (Turku, Finland).
6. **International Poster Presentation.** 2015. "Direct and host-mediated mechanisms of pesticide detoxification by probiotic lactobacilli," International Scientific Association for Probiotics and Prebiotics (Washington D.C., United States).
7. **Institutional Poster Presentation.** 2015. "Applications for *in vivo* organophosphate pesticide bioremediation by *Lactobacillus rhamnosus* GR-1," Infection and Immunity Research Forum (London, Canada).
8. **Invited Lecture.** 2015. "Mechanistic studies on the role of microbes in host toxic metals and pesticide uptake," Institute Pasteur de Lille (Lille, France).
9. **Institutional Poster Presentation.** 2014. "Temporal knockout of the  $\beta$ -cell insulin receptor during in utero development induces an islet compensatory response," 6th Annual Developmental Biology Research Day (London, Canada).
10. **Institutional Poster Presentation.** 2014. "Fetal  $\beta$ -cell insulin receptor expression level dictates islet development," London Health Research Day (London, Canada).

## PROFESSIONAL SERVICE

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2020-Present	<b>Secretary Executive</b> , Clinician Investigator Trainee Association of Canada.
2018-Present	<b>Managing Editor</b> , University of British Columbia Medical Journal.
2017-2019	<b>M.D./P.hD. Student Representative</b> , University of British Columbia, Faculty of Medicine Research Council.
2016-2018	<b>Academic Section Editor</b> , University of British Columbia Medical Journal.
2016-2018	<b>Conference Co-Chair</b> , Students in Health Annual Research, University of British Columbia
2015-2016	<b>Secretary Executive</b> , International Scientific Association for Probiotics and Prebiotics

## JOURNALS REFEED

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- Canadian Undergraduate Research Journal
- Applied and Environmental Microbiology
- University of Toronto Medical Journal
- Beneficial Microbes Name of Journal

## TEACHING EXPERIENCE

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2016	<b>Teaching Assistant</b> , University of Western Ontario, Department of Biology. <i>Biology 2244B – Analysis and Interpretation of Biological Data.</i>
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2015

**Teaching Assistant**, University of Western Ontario, Department of Microbiology and Immunology.  
*Microbiology and Immunology 3610F - Microbiology Laboratory.*

## REFEREES

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**Dr. Liam Brunham**, Assistant Professor  
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**Dr. John Boyd**, Associate Professor  
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**Dr. Brad Urquhart**, Associate Professor  
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